TECHNICAL REPORT

The Effect of Economic Growth on Poverty and Income Distribution in Developing Countries

A Literature Review and Data Analysis

PREPARED BY
Richard H. Adams, Jr.

SUBMITTED BY
Nathan Associates Inc.

SUBMITTED TO
USAID/Washington

SUBMITTED UNDER
Contract No. PCE-1-00-00-00013

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Introduction

Despite the financial crisis in East Asia, the world economy had a gross domestic product (GDP) growth rate of 2.5 percent per year during the 1990s. But to what extent did this economic growth benefit the poor of the developing world? Consider the following opposed views:

> ". . . (economic) growth generally does benefit the poor as much as everyone else. . . . Average incomes of the poorest fifth of society rise proportionately with average incomes (of the general population)."[1]

> "There is plenty of evidence that current patterns of (economic) growth and globalization are widening income disparities and thus acting as a brake on poverty reduction."[2]

If economic growth tends to raise the incomes of *all* members of society proportionately, including incomes of the poor, then economic growth should be both necessary and sufficient to reduce poverty in the developing world. But if economic growth tends to increase income (and asset) inequality, economic growth may benefit mainly the rich and not the poor. If this second position is true, then reducing poverty in poor countries requires tackling the considerable income and asset inequalities of those countries.

Deciding which of these arguments is correct is critical in defining development strategies for low-income countries in Africa, Asia, Latin America, and the Middle East. The development community has debated the adequacy of broad-based growth and development in achieving the international poverty target, or whether a more concerted focus on poverty and inequality is required. To understand how a broad-based growth and development strategy might contribute to poverty reduction, it is essential to understand how and to what extent economic growth is a necessary, if not sufficient, means for reducing poverty in the developing world.

This paper uses empirical evidence to address the central question: "To what extent does economic growth reduce poverty in the low-income countries?" The first section of this paper reviews recent analytical arguments about the relationship between economic growth, poverty, and income distribution. The second section presents a new household survey data set that contains detailed growth, poverty, and inequality data for 50 low- and lower-middle income countries. The third section describes the main findings of this data set, and pinpoints ten countries that have successfully reduced poverty. The next two sections use the new data set to analyze the relationship between growth and income distribution and growth and poverty in developing countries. The final section summarizes findings.

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[1] Dollar and Kray (2001: 32 and 1).

[2] Forsyth, letter to *The Economist* (2000: 6).

The Debate about Economic Growth, Poverty, and Income Distribution

Some have argued that economic growth is not sufficient to reduce poverty in the developing world. For instance, in *Redistribution with Growth* Hollis Chenery and others declared: "It is now clear that more than a decade of rapid growth in underdeveloped countries has been of little or no benefit to perhaps a third of their population" (1974: iii). Similarly, Adelman and Morris (1973) argued that "Development is accompanied by an absolute as well as a relative decline in the average income of the very poor…The frightening implication (of this) is that hundreds of millions of desperately poor people...have been hurt rather than helped by economic development" (1973: 189-193).

These early arguments about the relationship between growth and poverty were heavily influenced by the hypothesis of economist Simon Kuznets (1955, 1963). This hypothesis claims that growth and inequality are related in an inverted U-shaped curve: in the early stages of economic development, income distribution tends to worsen and does not improve until countries reach middle-income status. The implications of this hypothesis are obvious: if, in the early stages, economic growth is accompanied by increased inequality, then poverty might decline very slowly if at all.

The Kuznets hypothesis was based on cross-sectional data, that is, data from different countries observed at various stages of development at about the same point in time. If, however, the goal is to understand how growth affects inequality, what is really needed are time series data, which show how inequality changes within countries as they grow over time. In the last decade such time series data have been analyzed in a number of studies, including Ravallion (1995), Deininger and Squire (1996, 1998), Schultz (1998), and Bruno, Ravallion, and Squire (1998).[3] The empirical findings of all of these more recent studies tend to reject the Kuznets hypothesis. In the words of Ravallion: "The rejection of the inverted U hypothesis (of the Kuznets curve) could not be more convincing...The data do *not* suggest that growth tends to either increase or decrease inequality" (1995: 415).

The most current thinking is that economic growth does not have much of an impact on inequality because income distributions generally do not change much over time. According to Deininger and Squire (1996: 587), gross domestic product (GDP) per capita increased by 26 percent in the developing world between 1985 and 1995, while Gini coefficients in the world changed by only 0.28 percentage points per year over the same period.[4] In Taiwan (China), for example, real per capita income increased fivefold between 1964 and 1990, yet the Gini coefficient barely moved, declining from 32.2 to 30.1

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[3]For a review of these studies, see Fields (2001: 40-48).

[4] The Gini coefficient is a standard measure of inequality that is scaled to lie between 0 (perfect equality) and 100 (perfect inequality).

Insofar as income inequality tends to remain stable over time, economic growth can be expected to reduce poverty. The exact extent to which it does so depends on at least two factors. The first is the rate of economic growth itself. Using an international poverty line of $1 per person per day, an econometric study by Squire (1993) regressed the rate of poverty reduction in a country against its rate of economic growth. His results show that a one percent increase in the growth rate reduced the poverty headcount ($1 per person per day) by 0.24 percent. Bruno, Ravallion, and Squire (1998) did a similar econometric study. For 20 developing countries over the period 1984 to 1993, the authors regressed the rate of change in the proportion of the population living on less than $1 per person per day against the rate of growth (change in survey mean income) and obtained a statistically significant regression coefficient of –2.12. This means that a 10 percent increase in growth (as measured by survey mean income) can be expected to produce a 21.2 percent decrease in the proportion of people living in poverty ($1 per person per day).

The second factor affecting how much economic growth reduces poverty is the change (if any) in inequality. In a straightforward statistical sense, economic growth can be expected to reduce poverty more if inequality falls, than if it does not. This expectation is also confirmed by the study of Bruno, Ravallion, and Squire (1998). For the same 20 developing countries, these authors regressed the rate of change in poverty on both the change in growth (change in the survey mean) and the change in inequality (as measured by the Gini coefficient). They obtained statistically significant coefficients of –2.28 for the growth variable and 3.86 for the inequality variable. In other words, even small changes in the overall distribution of inequality can lead to sizeable changes in the incidence of poverty. For any given rate of economic growth, the greater the decline of inequality, the greater the decline in poverty.

The Data Set on Growth, Poverty, and Income Distribution

To test the relationship among economic growth, poverty, and income distribution, and to more accurately pinpoint the impact of growth on the poor, it is necessary to construct a new empirical data set. This data set should

1. Focus on the low-income countries of the world;
2. Use the results of household budget surveys because these surveys represent the best source of poverty information in most developing countries; and
3. Include *complete* growth, poverty, and inequality data for as many countries and time periods as possible.

Other observers have built such data sets to examine the impact of growth on poverty. Deininger and Squire (1996), for example, constructed a comprehensive database on income distribution for 58 countries. But this database included only 26 developing countries and did not contain any specific poverty data. Ravallion and Chen (1997), and later Chen and Ravallion (2000), also constructed useful data sets that had growth, poverty, and income distribution data. Their 1997 data set included 42 developing countries.

The purpose of this study is to expand the coverage of previous work by including the results of country-level household surveys that have become available since 1997. Initially, our goal was to include all 119 countries classified as "low income" or "lower middle income" by the World Bank in the *World Development Report, 2000/01*.[5] But finding poverty and inequality data for many of these countries proved impossible. A good number of these countries had only one household survey, and some of the smaller population countries had no surveys at all.

This paper thus uses data from 50 low-income and lower middle-income countries, all of which had at least two nationally representative household surveys since 1980.[6] We use 1980 as a cutoff point because many of the pre-1980 household surveys are of suspect quality.

Table 1 presents the countries, geographical regions, dates, and welfare indicators included in the new data set. The data set is notable in that it includes 13 countries in sub-Saharan Africa, a region for which household survey data are relatively rare. It also includes countries from all other regions of the developing world, including 4 countries in East Asia, 12 in Europe and Central Asia, 10 in Latin America, 5 in South Asia, and 6 in the Middle East and North Africa.

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[5] The full list of these 119 countries appears in World Bank, *World Development Report* (2001: 334).

[6] Of the 50 countries in the data set, 23 are classified by the World Bank as low income and 27 are classified as lower middle income.

Because our goal is to examine how economic growth affects poverty and inequality, we need at least two surveys for each country. In the data set two surveys for one country define an "interval." The data set includes 101 intervals, which is considerably more than previous studies.[7] In constructing the intervals we use relatively restrictive criteria: intervals must be 2 or more years in length, they must come from nationally representative surveys, and they must use the same "welfare indicator"—either expenditure per person or income per person—over time. Table 1 shows that most countries (30) use expenditure per person as the welfare indicator while only 4 countries use both expenditure and income. When countries use both indicators (i.e., they switch between expenditure and income), we either use the same indicator in computing an interval or drop the interval.

Table 2 summarizes the information for the 101 intervals from the 50 countries in the data set. In measuring changes in poverty, the table uses three poverty measures. The *headcount index*, set at $1 per person per day, measures the percent of the population living beneath that poverty line in various survey years. The headcount index is a bit simple because it ignores the amounts by which the expenditures (income) of the poor fall short of the poverty line. For this reason, Table 2 also reports the *poverty gap index*, which measures how far the average expenditures (income) of the poor fall short of the poverty line as a percentage. For instance, a poverty gap of 10 percent means that the average poor person's expenditures (income) are 90 percent of the poverty line.

While the poverty gap index measures the depth of poverty, the *squared poverty gap index* indicates the severity of poverty. The squared poverty index possesses useful analytical properties, because it is sensitive to changes in distribution among the poor. In other words, while a transfer of expenditures from a poor person to a poorer person will not change the headcount index or the poverty gap index, it will decrease the squared poverty gap index.

To ensure comparability across countries, all of the poverty lines in Table 2 are international poverty lines, set at estimates of $1.08 per person per day in 1993 purchasing power parity (PPP) exchange rates.[8] The PPP exchange rates are used so that $1.08 is worth roughly the same in all countries. PPP values are calculated by pricing a representative bundle of goods in each country and comparing the local cost of that bundle with the U.S. dollar cost of the same bundle. In calculating PPP values, the comparison of local costs with U.S. costs is done using conversion estimates produced by the World Bank.[9]

To measure changes in inequality, Table 2 presents two income distribution measures: the Gini coefficient and the percent share of expenditures (income) to either the lowest or the next-lowest quintile group. Both of these measures are normalized by household size and the distributions are weighted by household size so that a given quintile (such as the lowest quintile) has the same share of population as other quintiles across the sample.

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[7] For instance, the Ravallion and Chen study (1997) included only 64 intervals from 42 developing countries.

[8] The poverty line used in this paper is set at $1.08 per person per day, measured in 1993 PPP rates. This line is equivalent to the $1.00 per person per day poverty line, measured in 1985 PPP rates, used by Squire (1993) and Ravallion and Chen (1997). For simplicity, we will call this $1.08 person/day poverty line the $1.00 person/day poverty line.

[9] For a useful review and critique of PPP numbers, see Deaton (2001).

In examining the impact of economic growth on poverty and income distribution, the key question becomes "growth of what?" Growth can be defined in various ways, and the focus is on growth of average, or per capita, income. Table 2 presents two measures of growth: (1) change in the level of mean expenditure (income) per person, as calculated from the surveys; and (2) growth as measured by changes in GDP per capita, in PPP units, as measured from national accounts data. Unfortunately, rates of change of these two measures of growth often do not agree. Indeed, they move in opposite directions about one-third of the time (36 of 101 intervals in Table 2). This is not surprising, given their differences in definitions and coverage. Growth as measured by the survey mean comes from the household survey itself, so it is usually closely correlated with observed changes in household expenditures (income). However, growth as measured by GDP data comes from the national accounts, which measure household expenditure as a residual item, so that errors and omission elsewhere in the accounts automatically affect the calculation of household expenditures. A significant problem here is business expenditure, which has to be estimated and subtracted from expenditure totals to arrive at the expenditure of households. Since the national account data also include many items (such as the expenditures of nonprofit organizations and the imputed rent of owner-occupied dwellings) which are not included in the household surveys, it is little wonder that the two measures of growth do not correspond.

Which measure of growth is more accurate? According to Deaton, who has spent many years trying to reconcile household survey and national accounts measures of growth in India, the best answer is

> We don't know, although it seems safe to say that there are almost certainly errors in both the (national accounts and the household survey figures). There is a longstanding prejudice by many economists against using surveys and in favor of (using) national accounts (to measure growth), (however) this is probably without basis" (2001: 133).[10]

> Among Indian economists, who have also paid much attention to this problem, there is a growing demand to use some average of household survey and national accounts figures in measuring growth. Bhalla (2000, 2002), for example, argues that mean figures from household survey data should be adjusted upwards so as to match the (usually) higher national accounts data, and that these "adjusted" figures should then be used to measure growth. However, not only does this proposal make the questionable assumption that national accounts data are more accurate than household survey data, but it is also not clear how this "adjustment" factor should be calculated in individual countries.

In view of these debates, for the purposes of this study, we will report results using both household survey and national accounts (GDP) measures of growth. This is an improvement over the current literature, because many growth and poverty studies only report results using growth as defined by changes in the household survey mean.[11]

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[10] In India, the difference between growth as measured by the survey mean and growth as measured by the national accounts is widening; the difference in per capita growth rates in India is now about 2 percent per year. See Deaton (2001: 133) and Bhalla (2002).

[11] See, for example, Ravallion and Chen (1997).

Table 1. Coverage of the Data Set

Country	*Region*	*Income Group**	*Survey Years*	*Welfare Indicator*
Algeria	Middle East, North Africa	Lower middle	1988, 1995	Expenditure
Bangladesh	South Asia	Low	1983/84, 1985/86, 1988/89, 1991/92, 1995/96	Expenditure
Belarus	Europe, Central Asia	Lower middle	1988, 1993, 1995	Income
Bulgaria	Europe, Central Asia	Lower middle	1989, 1992, 1995	Expenditure
China (Rural)	East Asia	Lower middle	1990, 1992, 1994, 1996, 1998	Income
China (Urban)	East Asia	Lower middle	1990, 1992, 1994, 1996, 1998	Income
Colombia	Latin America	Lower middle	1988, 1991, 1995, 1996	Income
Costa Rica	Latin America	Lower middle	1986, 1990, 1993, 1996	Income
Cote d'Ivoire	Sub-Saharan Africa	Low	1985, 1987, 1993, 1995	Expenditure
Dominican Republic	Latin America	Lower middle	1989, 1996	Income
Ecuador	Latin America	Lower middle	1988, 1995	Expenditure
Egypt (Rural)	Middle East, North Africa	Lower middle	1991, 1995	Expenditure
Egypt (Urban)	Middle East, North Africa	Lower middle	1991, 1995	Expenditure
El Salvador	Latin America	Lower middle	1989, 1996	Income
Ethiopia	Sub-Saharan Africa	Low	1981, 1995	Expenditure
Ghana	Sub-Saharan Africa	Low	1987, 1989, 1992, 1997	Expenditure
Guatemala	Latin America	Lower middle	1987, 1989	Income
Honduras	Latin America	Lower middle	1989, 1992, 1994, 1996	Income
India	South Asia	Low	1983, 1986, 1988, 1990, 1995, 1997	Expenditure
Indonesia	East Asia	Low	1987, 1993, 1996, 1998	Expenditure
Jamaica	Latin America	Lower middle	1988, 1990, 1993, 1996	Income
Jordan	Middle East, North Africa	Lower middle	1986/87, 1992, 1997	Expenditure
Kazakhstan	Europe, Central Asia	Lower middle	1988, 1993, 1996	Income/Expenditure
Kenya	Sub-Saharan Africa	Low	1992, 1994	Expenditure
Kyrgyz Republic	Europe, Central Asia	Low	1988, 1993, 1997	Income
Latvia	Europe, Central Asia	Lower middle	1988, 1993, 1995, 1998	Income
Lesotho	Sub-Saharan Africa	Low	1986/87, 1993	Expenditure
Lithuania	Europe, Central Asia	Lower middle	1988, 1993, 1996	Income/Expenditure
Madagascar	Sub-Saharan Africa	Low	1980, 1993/94	Expenditure
Mali	Sub-Saharan Africa	Low	1989, 1994	Expenditure
Mauritania	Sub-Saharan Africa	Low	1988, 1993, 1995	Expenditure
Moldova	Europe, Central Asia	Low	1988, 1992	Income
Morocco	Middle East, North Africa	Lower middle	1984/85, 1990	Expenditure
Nepal	South Asia	Low	1985, 1995	Expenditure
Niger	Sub-Saharan Africa	Low	1992/93, 1995	Expenditure
Pakistan	South Asia	Low	1987/88, 1990/91, 1993, 1996/1997	Expenditure
Paraguay	Latin America	Lower middle	1990, 1995	Income
Peru	Latin America	Lower middle	1985, 1994, 1997	Expenditure/Income

Country	*Region*	*Income Group**	*Survey Years*	*Welfare Indicator*
Philippines	East Asia	Lower middle	1985, 1988, 1991, 1994, 1997	Expenditure
Romania	Europe, Central Asia	Lower middle	1989, 1992, 1994	Income
Russian Federation	Europe, Central Asia	Lower middle	1994, 1996, 1998	Expenditure
Senegal	Sub-Saharan Africa	Low	1991, 1994	Expenditure
Sri Lanka	South Asia	Lower middle	1985, 1990, 1995	Expenditure
Tanzania	Sub-Saharan Africa	Low	1991, 1993	Expenditure
Thailand	East Asia	Lower middle	1988, 1992, 1996, 1998	Expenditure
Tunisia	Middle East, North Africa	Lower middle	1985, 1990	Expenditure
Turkey	Europe, Central Asia	Lower middle	1987, 1994	Expenditure
Turkmenistan	Europe, Central Asia	Low	1988, 1993	Income
Uganda	Sub-Saharan Africa	Low	1989, 1992/93	Expenditure
Ukraine	Europe, Central Asia	Low	1989, 1992, 1996	Income/Expenditure
Uzbekistan	Europe, Central Asia	Low	1988, 1993	Income
Zambia	Sub-Saharan Africa	Low	1991, 1993, 1996	Expenditure

* Income group classifications come from World Bank, *World Development Report*, 2000/2001. Low income includes countries with 1999 GNP per capita $756 or less; lower-middle includes countries with 1999 GNP per capita of $756 to $2,995. In 2000/01, there was a total of 119 low income and lower-middle income countries.

SOURCES: World Bank, Global Poverty Monitoring database.

Table 2. Summary of Survey Data on Poverty, Income Distribution and Growth

Country	Survey Year	Poverty Headcount ($1.08/ person /day)	Poverty Gap (%)	Poverty Gap Squared	Gini Coefficient	Percent Share to Lowest Quintile	Percent Share to 2nd Lowest Quintile	Survey Mean ($/person/ month)	Percent Change in Survey Mean	Percent change in GDP per capita, PPP (1999$)
Algeria	1988	1.75	0.64	0.48	40.14	6.54	10.79	168.79		
Algeria	1995	1.16	0.23	0.09	35.33	6.97	11.55	157.93	-6.44	2.24
Bangladesh	1983/84	26.16	5.98	1.96	25.88	9.72	14.29	48.16		
Bangladesh	1985/86	21.96	3.92	1.08	26.92	10.04	13.82	52.74	9.51	14.25
Bangladesh	1988/89	33.75	7.72	2.45	28.85	9.45	13.36	46.68	-7.7	22.87
Bangladesh	1991/92	35.86	8.77	2.98	28.27	9.35	13.51	44.88	-7.81	9.99
Bangladesh	1995/96	29.07	5.88	1.60	33.63	8.71	12.02	55.20	22.99	21.85
Belarus	1988	0	0	0.00	22.76	10.49	14.88	203.17		
Belarus	1993	1.06	0.13	0.03	21.6	11.12	15.3	82.49	-59.4	-5.54
Belarus	1995	2.27	0.71	0.46	28.76	8.51	13.46	114.18	38.42	-18.1
Bulgaria	1989	0	0	0.00	23.33	10.62	14.91	315.08		
Bulgaria	1992	0	0	0.00	30.8	8.31	13.02	300.95	-4.49	-15.52
Bulgaria	1995	0	0	0.00	28.25	8.51	13.83	163.91	-45.54	13.49
China (Rural)	1990	50.27	16.38	7.26	33.5	7.33	11.85	38.47		
China (Rural)	1992	40.62	12.33	5.20	38.98	6.17	10.37	44.00	14.37	29.13
China (Rural)	1994	34.64	11.35	5.29	43.34	5.35	9.74	48.40	10	29.81
China (Rural)	1996	24.11	6.71	2.84	39.8	5.89	10.37	59.02	21.94	25.25
China (Rural)	1998	24.14	6.88	3.02	40.3	5.86	10.2	58.84	-0.31	13.65
China (Urban)	1990	0.95	0.04	0.01	33.5	7.33	11.85	99.54		
China (Urban)	1992	0.83	0.29	0.24	38.98	6.17	10.37	114.02	14.55	29.13
China (Urban)	1994	0.86	0.23	0.13	43.34	5.35	9.74	133.96	17.49	29.81
China (Urban)	1996	0.46	0.13	0.08	39.8	5.89	10.37	144.90	8.17	25.25
China (Urban)	1998	0.98	0.39	0.33	40.3	5.86	10.2	156.26	7.84	13.65
Colombia	1988	4.47	1.31	0.57	53.11	3.33	7.21	322.41		
Colombia	1991	2.82	0.75	0.33	51.32	3.61	7.59	349.96	8.54	6.89
Colombia	1995	8.87	2.05	0.63	57.4	3.19	6.62	218.51	-37.57	23.17
Colombia	1996	10.99	3.16	1.21	57.14	3	6.6	207.59	-5	2.34
Costa Rica	1986	12.52	5.44	3.27	34.42	5.21	12.24	101.52		
Costa Rica	1990	11.08	4.19	2.37	45.66	4.02	9.06	149.45	47.21	28.04
Costa Rica	1993	10.3	3.53	1.80	46.28	4.16	8.84	155.92	4.33	11.97
Costa Rica	1996	9.57	3.18	1.55	47.08	4.04	8.63	169.40	8.64	14.4
Cote d'Ivoire	1985	4.71	0.59	0.11	41.21	5.69	10.07	146.89		
Cote d'Ivoire	1987	3.28	0.41	0.09	40.01	6.48	10.46	131.23	-10.67	10.62
Cote d'Ivoire	1993	9.88	1.86	0.55	36.91	7.05	11.16	91.52	-30.26	1.03
Cote d'Ivoire	1995	12.29	2.4	0.71	36.68	7.13	11.17	85.29	-6.81	3.23
Dominican Republic	1989	7.73	1.51	0.42	50.46	4.19	7.89	172.90		
Dominican Republic	1996	3.19	0.71	0.26	48.71	4.28	8.31	242.85	40.45	25.65

Country	Survey Year	Poverty Headcount ($1.08/ person /day)	Poverty Gap (%)	Poverty Gap Squared	Gini Coefficient	Percent Share to Lowest Quintile	Percent Share to 2nd Lowest Quintile	Survey Mean ($/person/ month)	Percent Change in Survey Mean	Percent change in GDP per capita, PPP (1999$)
Ecuador	1988	24.85	10.21	5.82	43.91	4.44	10.03	74.79		
Ecuador	1995	20.21	5.77	2.27	43.73	5.38	9.42	88.97	18.96	16.58
Egypt (Rural)	1991	3.97	0.53	0.13	36	7	12.7	88.63		
Egypt (Rural)	1995	1.06	0.06	0.01	23.5	11.3	14.4	69.56	-21.52	17.32
Egypt (Urban)	1991	3.97	0.53	0.13	34	8.2	12.1	88.63		
Egypt (Urban)	1995	5.55	0.66	0.14	33.1	8.4	12	85.48	-3.56	17.32
El Salvador	1989	25.49	13.72	10.06	48.96	2.47	8.47	91.09		
El Salvador	1996	25.26	10.35	5.79	52.25	3.4	7.5	101.21	11.11	41.23
Ethiopia	1981	32.73	7.69	2.71	32.42	8.56	12.67	50.26		
Ethiopia	1995	31.25	7.95	2.99	39.96	7.17	10.87	59.20	17.79	36.77
Ghana	1987	15.87	3.87	1.29	35.35	6.97	11.72	76.90		
Ghana	1989	13.98	3.36	1.28	35.99	6.99	11.54	79.85	3.83	9.8
Ghana	1992	1.23	0.19	0.06	33.91	7.91	11.96	122.03	52.82	9.71
Ghana	1997	78.36	34.18	17.93	32.72	8.48	12	25.69	-78.95	16.58
Guatemala	1987	47.04	22.47	13.63	58.26	2.76	6.19	66.38		
Guatemala	1989	39.81	19.79	12.59	59.6	2.15	5.68	84.50	27.3	8.58
Honduras	1989	44.67	20.65	12.08	59.49	2.76	5.88	74.40		
Honduras	1992	38.98	17.74	10.41	54.51	2.96	6.77	74.93	0.71	6.93
Honduras	1994	37.93	16.6	9.38	55.22	3.09	6.75	78.04	4.15	2.88
Honduras	1996	40.49	17.47	9.72	53.72	3.41	7.07	70.37	-9.83	6.94
India	1983	52.55	16.27		32.06	8.5	12.5	43.67		
India	1986	47.46	13.92		33.68	8.23	12.12	47.14	7.95	26.23
India	1988	47.99	13.51		32.93	8.66	12.21	46.86	-0.6	27.99
India	1990	45.95	12.63		31.21	8.85	12.68	46.24	-1.33	4.41
India	1995	46.75	12.72		36.32	7.52	11.3	47.61	2.96	38
India	1997	44.03	11.96		37.83	8.06	11.59	49.92	4.85	8.51
Indonesia	1987	28.08	6.08	1.78	33.09	8.47	12.12	55.67		
Indonesia	1993	14.82	2.08	0.39	31.69	8.68	12.27	68.54	23.11	55.87
Indonesia	1996	7.81	0.95	0.18	36.45	7.96	11.25	86.62	26.37	24.96
Indonesia	1998	26.33	5.43	1.70	31.51	8.96	12.52	61.19	-29.36	-7.83
Jamaica	1988	5.02	1.38	0.67	43.16	5.41	9.78	151.91		
Jamaica	1990	0.62	0.03	0.01	41.79	5.98	9.88	168.85	11.15	11.79
Jamaica	1993	4.52	0.86	0.29	37.92	6.82	11.05	118.43	-29.87	2.59
Jamaica	1996	3.15	0.73	0.33	36.43	7.06	11.45	124.94	5.49	3.39
Jordan	1986/87	0	0	0.00	36.06	7.27	11.24	268.80		
Jordan	1992	0.55	0.12	0.05	43.36	5.99	9.69	211.30	-21.4	-3.61
Jordan	1997	0.36	0.1	0.06	36.42	7.56	11.43	183.89	-12.98	5.34
Kazakhstan	1988	0.05	0.02	0.01	25.74	9.46	14	195.62		
Kazakhstan	1993	1.06	0.04	0.01	32.67	7.49	12.32	132.69	-32.17	-24.7
Kazakhstan	1996	1.49	0.27	0.10	35.4	6.68	11.51	162.70	22.76	-11.35

Country	*Survey Year*	*Poverty Headcount ($1.08/ person /day)*	*Poverty Gap (%)*	*Poverty Gap Squared*	*Gini Coefficient*	*Percent Share to Lowest Quintile*	*Percent Share to 2nd Lowest Quintile*	*Survey Mean ($/person/ month)*	*Percent Change in Survey Mean*	*Percent change in GDP per capita, PPP (1999$)*
Kenya	1992	33.54	12.82	6.62	57.46	3.39	6.72	89.71		
Kenya	1994	26.54	9.03	4.50	44.54	5.09	9.61	73.74	-17.81	1.82
Kyrgyz Republic	1988	0	0	0.00	26.01	10.11	13.63	180.65		
Kyrgyz Republic	1993	22.99	10.87	6.82	53.7	2.51	7.06	121.54	-32.73	-25.97
Kyrgyz Republic	1997	1.57	0.28	0.10	40.5	6.29	10.2	166.01	36.59	-6.67
Latvia	1988	0	0	0.00	22.49	10.44	14.92	407.89		
Latvia	1993	0	0	0.00	26.98	9.6	13.6	153.33	-62.41	-41.89
Latvia	1995	0	0	0.00	28.47	8.33	13.76	181.60	18.44	7.15
Latvia	1998	0.19	0.01	0.00	32.37	7.57	12.92	181.42	-0.1	19.02
Lesotho	1986/87	30.34	12.66	6.85	56.02	2.87	6.4	101.93		
Lesotho	1993	43.14	20.26	11.84	57.94	2.61	5.51	80.16	-21.36	82.19
Lithuania	1988	0	0	0.00	22.48	10.56	14.93	381.87		
Lithuania	1993	16.47	3.37	0.95	33.64	8.09	12.34	67.86	-82.23	-35.75
Lithuania	1996	0	0	0.00	32.36	7.83	12.62	171.25	152.36	5.39
Madagascar	1980	49.18	19.74	10.21	46.85	4.96	8.79	50.14		
Madagascar	1993/94	60.17	24.46	12.83	43.44	5.8	9.87	39.07	-22.08	17.15
Mali	1989	16.46	3.92	1.39	36.51	7.03	11.33	76.75		
Mali	1994	72.29	37.38	23.09	50.5	4.64	7.8	32.47	-57.7	3.48
Mauritania	1988	40.64	19.07	12.75	42.53	3.53	10.69	48.10		
Mauritania	1993	49.37	17.83	8.58	50.05	5.16	8.58	54.53	13.37	20.17
Mauritania	1995	30.98	9.99	4.60	38.94	6.19	10.78	59.50	9.11	5.46
Moldova	1988	0	0	0.00	24.14	9.96	14.56	324.88		
Moldova	1992	7.31	1.32	0.32	34.43	6.85	11.88	106.24	-67.3	-45.68
Morocco	1984/85	2.04	0.7	0.50	39.19	6.58	11.07	153.80		
Morocco	1990	0.14	0.02	0.01	39.2	6.57	10.45	211.72	37.66	44.14
Nepal	1985	35.76	8.68	3.02	33.44	7.44	12.06	56.30		
Nepal	1995	37.68	9.74	3.71	38.78	7.59	11.26	52.60	-6.58	74.23
Niger	1992/93	41.73	12.46	5.29	36.1	7.45	11.72	47.07		
Niger	1995	61.42	33.93	23.66	50.61	2.45	7.29	36.17	-23.16	5.39
Pakistan	1987/88	49.63	14.85	6.03	33.35	8.35	12.22	41.05		
Pakistan	1990/91	47.76	14.57	6.04	33.23	8.08	12.26	41.66	1.48	14.93
Pakistan	1993	33.9	8.44	3.01	34.22	8.25	11.97	51.56	23.76	15.28
Pakistan	1996/97	30.96	6.16	1.87	31.24	9.45	12.91	50.22	-2.6	11.63
Paraguay	1990	11.05	2.47	0.80	39.74	5.95	10.28	106.77		
Paraguay	1995	19.36	8.27	4.65	59.13	2.25	5.9	170.69	59.86	16.73
Peru	1985	1.14	0.29	0.14	45.72	4.91	9.04	264.48		
Peru	1994	9.13	2.37	0.92	44.58	4.81	9.34	137.48	-48.02	22.16
Peru	1997	15.49	5.38	2.81	46.24	4.38	9.05	112.09	-18.47	15.72
Philippines	1985	22.78	5.32	1.66	41.04	6.44	10.11	74.98		
Philippines	1988	18.28	3.59	0.94	40.68	6.5	10.06	82.79	10.42	31.62

Country	*Survey Year*	*Poverty Headcount ($1.08/ person /day)*	*Poverty Gap (%)*	*Poverty Gap Squared*	*Gini Coefficient*	*Percent Share to Lowest Quintile*	*Percent Share to 2nd Lowest Quintile*	*Survey Mean ($/person/ month)*	*Percent Change in Survey Mean*	*Percent change in GDP per capita, PPP (1999$)*
Philippines	1991	15.7	2.79	0.66	43.82	5.88	9.31	87.75	5.99	2.94
Philippines	1994	18.36	3.85	1.07	42.89	5.95	9.5	89.10	1.54	4.9
Philippines	1997	14.4	2.85	0.75	46.16	5.36	8.78	110.19	23.67	11.87
Romania	1989	0	0	0.00	23.31	9.93	14.99	191.03		
Romania	1992	0.8	0.34	0.31	25.46	9.22	14.36	144.27	-24.48	-18.32
Romania	1994	2.81	0.76	0.43	28.2	8.85	13.61	99.92	-30.75	9.4
Russian Federation	1994	6.23	1.6	0.55	43.59	4.56	9.68	184.06		
Russian Federation	1996	7.24	1.6	0.47	48.05	4.33	8.69	175.45	-4.68	-2.77
Russian Federation	1998	7.05	1.45	0.39	48.72	4.39	8.61	173.33	-1.21	-2.34
Senegal	1991	45.38	19.95	11.18	54.12	3.5	6.97	63.70		
Senegal	1994	26.26	7.04	2.73	41.28	6.43	10.34	67.87	6.54	2.66
Sri Lanka	1985	9.39	1.69	0.50	32.47	8.29	12.37	78.77		
Sri Lanka	1990	3.82	0.67	0.23	30.1	8.92	13.14	86.84	10.24	39.43
Sri Lanka	1995	6.56	1	0.26	34.36	8.02	11.82	88.33	1.71	36.62
Tanzania	1991	48.54	24.42	15.41	59.01	2.44	5.73	66.22		
Tanzania	1993	19.89	4.77	1.66	38.1	6.85	10.9	73.26	10.63	1.51
Thailand	1988	25.91	7.36	2.55	43.84	6.12	9.36	90.46		
Thailand	1992	6.02	0.48	0.05	46.22	5.62	8.74	129.80	43.49	47.27
Thailand	1996	2.2	0.14	0.01	43.39	6.08	9.46	143.87	10.84	42.38
Thailand	1998	0	0	0.00	41.36	6.37	9.81	138.88	-3.47	-12.92
Tunisia	1985	1.67	0.34	0.13	43.43	5.54	9.63	189.63		
Tunisia	1990	1.26	0.33	0.17	40.24	5.86	10.41	204.00	7.58	27.12
Turkey	1987	1.49	0.36	0.17	43.57	5.91	9.81	180.59		
Turkey	1994	2.35	0.55	0.24	41.53	5.8	10.15	170.34	-5.68	25.39
Turkmenistan	1988	0	0	0.00	26.39	10.03	13.51	111.69		
Turkmenistan	1993	20.92	5.69	2.10	35.76	6.7	11.44	69.91	-37.41	-15.36
Uganda	1989	39.17	14.99	7.57	44.36	4.94	9.28	57.57		
Uganda	1992/93	36.7	11.44	5.00	39.16	6.57	10.85	53.86	-6.45	17.1
Ukraine	1989	0	0	0.00	23.31	10.31	14.76	309.85		
Ukraine	1992	0.04	0.01	0.01	25.71	9.54	14.12	191.70	-38.14	-17.42
Ukraine	1996	0	0	0.00	32.53	8.58	12.04	120.14	-37.32	-43.02
Uzbekistan	1988	0	0	0.00	24.95	10.61	13.77	204.40		
Uzbekistan	1993	3.29	0.46	0.11	33.27	7.38	12.04	116.28	-43.12	-27.33
Zambia	1991	58.59	31.04	20.18	48.29	3.39	7.48	39.09		
Zambia	1993	69.16	38.49	25.71	46.18	3.92	7.98	28.70	-26.58	0.76
Zambia	1996	72.63	37.75	23.88	49.79	4.2	8.15	31.11	8.39	-8.83

Notes: All data from household surveys conducted in individual countries, and reported in the World Bank's Global Poverty Monitoring database. Data on changes in GDP per capita are measured in purchasing power parity (PPP) exchange rates, whereby local currencies are converted into international dollars. Data on changes in GDP measured in PPP units are from World Bank, 2001 World Development Indicators database.

Main Findings

Table 2 shows that definite changes took place in the poverty and income distribution measures over the period 1980 to 1999. Poverty, when measured by the headcount index of $1.00 per person per day, declined in slightly over half (52 of 101) of the intervals in the data set. The poverty gap index also declined in slightly more than half (54 of 101) of the intervals. Income inequality, as measured by the Gini coefficient, increased in 55 of 101 intervals, including some where income declined. More generally, countries making the transition from Communism accounted for a relatively large number (24, including China) of the cases where income inequality increased.

At the country level, some of the changes in poverty and inequality shown in Table 2 are quite large. For example, in Ghana the headcount index of poverty ($1 person/day) increased from 1.2 to 78.4 percent between 1992 and 1997. Two possible explanations exist for such large "swings" in poverty. The first is that in many developing countries, poverty, as measured by the $1 per person per day standard, is quite "shallow" in the sense that many people are clustered right above (and below) the poverty line. Thus, even modest rates of economic growth (or decline) produce large changes in the proportion of people living in poverty. The second explanation is measurement error in the household surveys themselves. In countries where household survey procedures and techniques are still being refined, it is quite possible that household expenditures (incomes) are being measured with nonrandom error.

Among the countries in Table 2, ten experienced particularly strong—and noteworthy—records of poverty reduction. These include China (rural), Ecuador, Guatemala, India, Mauritania, Pakistan, Philippines, Senegal, Tanzania, and Thailand. Each country lowered the proportion of people living on less than $1.00 per day by 4 or more percentage points. Thailand actually reduced the proportion of people living on less than $1.00 per day from 26 percent to zero.

Table 3 summarizes the relevant poverty, inequality, and growth data for these ten poverty-reducing countries. All ten reduced poverty with the help of positive economic growth, where growth is measured by either GDP per capita or the survey mean. With only three exceptions (India, Senegal, and Tanzania), annual rates of growth in each country exceeded 2.0 percent per year. The table also reveals that these reductions in poverty were accompanied by a mixed pattern of changes in inequality. Four countries—China (rural), Guatemala, India and Philippines—experienced increases in the Gini coefficient of inequality, while the other six countries experienced declines.

Table 3. Ten Successful Poverty Reducing Countries, Ranked by Extent of Reduction (Poverty headcount=$1.08 per person per day)

Country, Beginning and End Survey Years	*Extent of Poverty Reduction (Total Percent Change in Poverty Headcount)*	*Extent of Poverty Reduction (Total Percent Change in Poverty Gap)*	*Total Change in Gini Coefficient*	*Annual Percent Change in GDP per Capita*	*Annual Percent Change in Survey Mean*
Tanzania					
1991	-28.65	-19.65	-20.91	0.75	5.18
1993					
China (rural)					
1990	-26.14	-9.50	7.20	11.48	5.45
1998					
Thailand					
1988	-25.91	-7.36	-2.48	6.21	4.38
1998					
Senegal					
1991	-19.12	-12.91	-12.84	0.87	2.13
1994					
Pakistan					
1987/88	-18.67	-8.69	-1.11	4.44	2.26
1996/97					
Mauritania					
1988	-9.66	-9.08	-3.59	2.66	3.08
1995					
India					
1983	-8.52	-4.31	5.77	6.87	0.96
1997					
Philippines					
1985	-8.38	-2.47	5.12	3.94	3.26
1997					
Guatemala					
1987	-7.23	-2.68	1.34	4.20	12.82
1989					
Ecuador					
1988	-4.64	-4.44	-0.18	2.21	2.51
1995					

SOURCE: Table 2.

Economic Growth and Income Distribution

Table 4 provides a regional summary of how economic growth affects inequality. For the data set as a whole, the two measures of growth suggest rather different rates of change. Economic growth, as measured by the survey mean, rose in 52 of the 101 intervals, but the average rate of change in the survey mean was a slightly negative -0.90 percent per year. However, economic growth as measured by GDP per capita was much stronger: GDP per capita rose in 80 of the 101 intervals and increased at an average rate of 2.66 percent per annum.[12]

Whatever the correct rate of economic growth was, inequality rose in slightly more than half (55) of the intervals in the data set. The average annual rate of increase in the Gini coefficient was small—only 0.94 percent per year.

Table 4 shows that economic growth was much more rapid in the lower middle-income countries than in the low-income countries. This was a reflection of slow (and sometimes negative) growth in two regions: Eastern Europe and Central Asia, and sub-Saharan Africa. All of the sub-Saharan countries and about half of the Eastern Europe and Central Asian countries are classified as low income. The disappointing rates of economic growth in these two regions pulled down the averages for low-income countries as a whole.

Among the various regions, Eastern Europe and Central Asia was clearly the worst performer in both growth and inequality. As shown in Table 4, economic growth declined between 3.5 and 5.2 percent per year in Eastern Europe and Central Asia and inequality increased at a high average rate of 4.34 per annum.[13] This disappointing performance was caused by the collapse of the Soviet Union. After the Soviet Union folded, wage and income opportunities for millions of workers in the region declined dramatically, while returns to risk and entrepreneurship increased substantially for a select few. As a result, economic growth fell sharply and income inequality rose.

By comparison, two regions—the Middle East and North Africa, and sub-Saharan Africa—recorded reductions in income inequality. Inequality fell in 5 of 7 intervals for the Middle East and North Africa, and declined by an average 2.02 percent per year. In sub-Saharan Africa inequality fell in 12 of 19 intervals, and declined by an average 1.67 percent per year. While the reasons for this impressive achievement are unclear for the Middle East and North Africa, many countries of sub-Saharan Africa began with very unequal income distributions (Gini coefficients of 45.0 of higher). These Gini coefficients tended to fall during the period covered by the analysis.

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[12] Economic growth, as measured by GDP data from the national accounts, is usually found to be higher than economic growth, as measured by changes in survey mean income (consumption). For example, Ravallion (2000) finds that GDP growth in China and Latin America is 30 to 50 percent higher than growth in survey mean income (consumption).

[13] For more on the increase in inequality (and poverty) in Eastern Europe and Central Asia, see World Bank (2000).

Table 4. Regional Summary of Changes in Growth and Income Distribution

Designation	*Number of intervals*	*Real survey mean per capita household income or consumption*			*GDP Per Capita, 1999 PPP Values*			*Inequality* [a]		
		Number of intervals for which it		*Mean rate of change (percent per year)*	*Number of intervals for which it*		*Mean rate of change (percent per year)*	*Number of intervals for which it*		*Mean rate of change (percent per year)*
		fell	*rose*		*fell*	*rose*		*fell*	*rose*	
East Asia	18	3	15	3.58	2	16	7.33	8	10	1.64
Eastern Europe and Central Asia	23	18	5	-5.22	17	6	-3.48	5	18	4.34
Latin America and the Caribbean	19	6	13	0.77	0	19	3.28	10	9	0.56
Middle East and North Africa	7	5	2	-1.04	1	6	2.95	5	2	-2.02
South Asia	15	6	9	1.36	0	15	5.95	6	9	0.82
Sub-Saharan Africa	19	11	8	-3.32	1	18	2.36	12	7	-1.67
Low Income Countries	42	24	18	-2.82	9	33	1.95	20	22	0.38
Lower Middle Income Countries	59	25	34	0.47	12	47	3.17	26	33	1.33
Total	101	49	52	-0.90	21	80	2.66	46	55	0.94
Total (excl. former Soviet bloc countries)[1]	78	31	47	0.37	4	74	4.47	41	37	0.04

[a] Inequality is measured by the Gini coefficient

Notes: For a list of the former Soviet bloc countries, see footnote 17.

Figure 1 tries to broaden the examination of growth and inequality by plotting the changes in the (log) Gini coefficient against the changes in the (log) real survey mean income (consumption) for all countries in the data set.[14] If the tendency for economic growth to increase inequality were strong, then most of the observations in Figure 1 would lie in the upper right quadrant (labeled "growth in mean with increasing inequality"). But the observations in Figure 1 are distributed fairly equally among all four quadrants. In about 40 percent of the cases (21 of 52 intervals) where there is growth in the (log) survey mean income (consumption), the (log) Gini coefficient actually declines and the observations lie in the lower right quadrant. This suggests that there is no strong correlation between economic growth (measured by the survey mean) and income distribution. Table 5 summarizes the data represented in Figure 1.

Figure 1. Growth and Inequality, Plotted Using Survey Mean Income (Consumption)

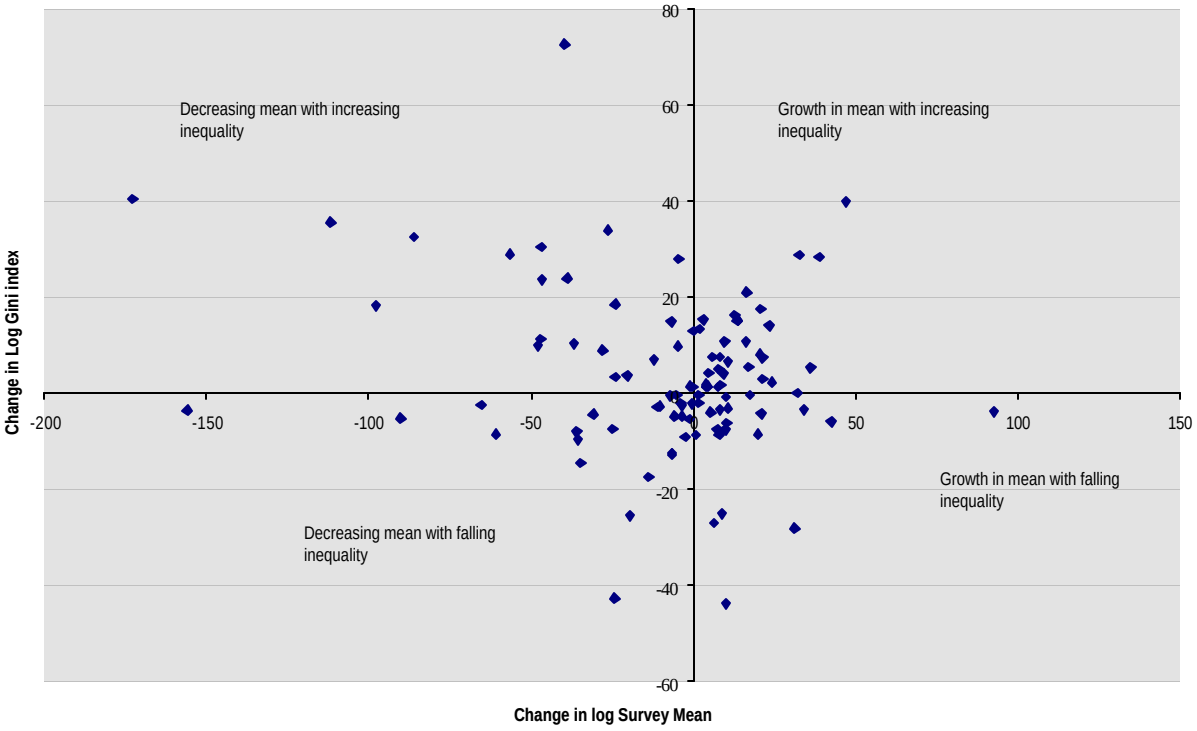


Table 5. Growth and Inequality Matrix, Plotted Using Survey Mean Income (Consumption)

	Increasing Inequality	Stable Inequality	Decreasing Inequality
Increasing Survey Mean Income	31	0	21
No Change Survey Mean Income	1	0	0
Decreasing Survey Mean Income	23	0	25

[14] In this paper, "consumption" and "expenditure" are used interchangeably.

It is possible to further analyze the relationship between economic growth and inequality using econometric techniques. By regressing the change in the (log) Gini coefficient on either the (log) survey mean or the (log) GDP per capita, it is possible to calculate elasticities of inequality with respect to growth.[15] The results of this exercise are shown in Table 6. As expected from the literature review, economic growth has *no* statistical or systematic effect on income distribution: none of the growth elasticities[16] of inequality in Table 6 is statistically significant. Moreover, the very low R^2s of the regressions suggest that the independent variables for growth are doing a poor job of explaining variations in the dependent variable (e.g., changes in inequality). As Ravallion (1995) has noted on an earlier data set, economic growth does not have a statistically significant impact on inequality one way or the other. Sometimes inequality increases with economic growth; sometimes it decreases.

Table 6. Income Elasticities of Inequality, Estimated Using the Gini Coefficient of Inequality

Measure of Economic Growth and Sample	*Growth Elasticity of Inequality*	*Adjusted R^2*
Survey Mean income (consumption)		
Low income countries	-0.048	0.01
	(-0.77)	
Lower middle income countries	0.053	-0.02
	(0.73)	
Full sample	0.037	-0.01
	(0.96)	
GDP per capita, 1999 PPP values		
Low income countries	0.012	0.01
	(0.38)	
Lower middle income countries	-0.084	-0.01
	(-0.96)	
Full sample	-0.005	-0.02
	(-0.15)	

Notes: Estimates were obtained using ordinary least squares, regressing the difference between household surveys in the log of the Gini coefficient of inequality on two variables: (1) the time elapsed between the surveys; and (2) the difference in the log of the real value of the survey mean (or GDP per capita). Results for the time elapsed variable (which is included to account for the uneven spacing of the surveys) are not shown. T-ratios are in parentheses. Sample sizes are 59 intervals for low income countries, 42 intervals for lower middle income countries, and 101 intervals for the full sample. See Table 1 for countries and survey dates.

[15] It is necessary to express the dependent and independent variables in the regression in log terms, in order to calculate the elasticities.

[16] "Growth elasticity" is used in this paper to mean the responsiveness of poverty to changes in income or consumption.

Economic Growth and Poverty

Table 7 summarizes changes in poverty in the data set, when poverty is measured by the proportion of people living on less than $1.00 per person per day. For the data set as a whole, poverty fell in about half of the intervals: 52 of 101 intervals. In low-income countries, poverty fell just as often as it increased, while in the lower middle-income countries poverty fell in the majority of cases (31 of 59 intervals).

Table 7. Regional Summary of Changes in Poverty

Region	*Total*	*Number of intervals*			*Mean rate of change (percent per year)*
		Poverty decreased [a]	*Poverty increased* [a]	*No change*	
East Asia	18	13	5	-	-7.01
Eastern Europe and Central Asia	23	4	15	4	108.45
Latin America and the Caribbean	19	12	7	-	4.45
Middle East and North Africa	7	5	2	-	4.28
South Asia	15	9	6	-	-1.65
Sub-Saharan Africa	19	9	10	-	3.56
Low Income Countries	42	21	21	-	34.6
Lower Middle Income Countries	59	31	24	4	18.17
Total	101	52	45	4	25.01

[a] Poverty is measured by headcount index of $1.08/person/day

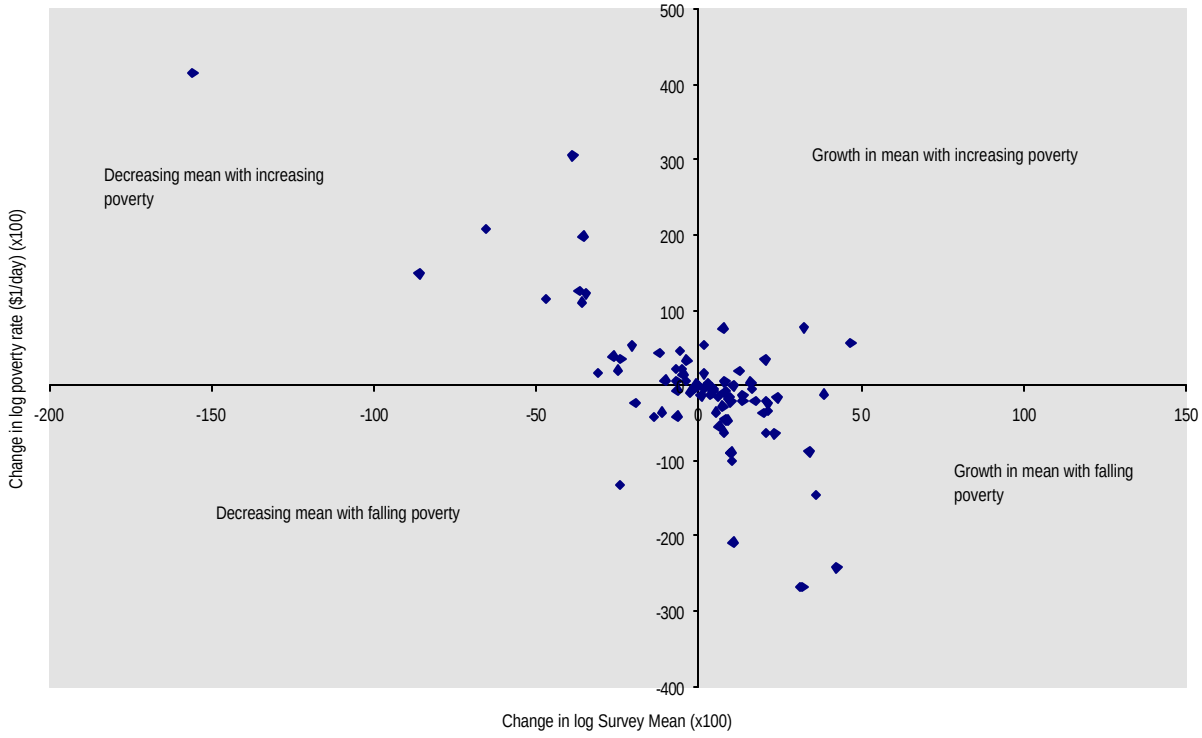
But these summary data mask important differences between the various regions. Europe and Central Asia, in particular, had a *very* poor poverty record. In Europe and Central Asia poverty increased in 15 of 23 intervals and rose by a whopping average rate of 108.45 percent per year! This performance, clearly the worst of any region of the world, reflects economic "meltdown" that occurred after 1990. With the collapse of Soviet Union, many state-owned firms and enterprises in Europe and Central Asia went bankrupt, throwing many people out of work and into poverty. As a result, poverty headcount ratios ($1.00 per person per day) went from zero to as high as 20 percent in a number of the former Soviet bloc countries, including Kyrgyz Republic, Turkmenistan, and Lithuania.[17] Since the late 1990s some of these large increases in poverty have moderated, but poverty still remains much higher in Europe and Central Asia than it was before the breakup of the Soviet Union.

[17] For example, between 1988 and 1993, the poverty headcount ($1.00 per person per day) increased from zero to 22.9 in the Kyrgyz Republic, and from zero to 20.9 percent in Turkmenistan. See Table 2.

By contrast, South Asia and East Asia had impressive records of poverty reduction. Table 7 shows that poverty fell in both regions about 60 percent of the time: 9 of 15 intervals for South Asia and 13 of 18 intervals for East Asia. South Asia recorded a 1.65 annual average reduction in the proportion of people living on less than $1.00 per day. This was driven by high rates of poverty reduction in Bangladesh, India, and Pakistan. East Asia did an even better job, reducing its poverty headcount ratio by an average 7.01 percent per year. This impressive achievement was largely the result of two factors. First, China's decision to re-introduce capitalism into its economy dramatically reduced rural poverty. Second, Thailand's continuing economic "miracle" reduced to zero the number of people living on less than $1.00 per day.

Figure 2 extends the analysis of growth and poverty by plotting the changes in the (log) poverty headcount ($1.00/person/day) against changes in the (log) of real survey mean income (consumption). At first glance, many of the observations appear to lie on the horizontal axis line. In reality, however, about 40 percent of the observations (41 out of 101) lie in the lower right quadrant (labeled "growth in mean with falling poverty"). By contrast, only a few observations—10 out of 101 intervals—lie in the upper right quadrant (labeled "growth in mean with increasing poverty"). An equally small number of observations—11—lie in the lower left quadrant (labeled "decreasing mean with falling poverty"). All of this suggests that increasing growth in survey mean income (consumption) *may* be associated with falling poverty. As mean incomes rise, poverty appears to fall.

Figure 2. Growth and Poverty, Plotted Using Survey Mean Income (Consumption)



It is possible to rigorously test this relationship using econometric techniques. By regressing the change in the (log) poverty measure on either the (log) survey mean or the (log) GDP per capita, it is

possible to calculate elasticities of poverty with respect to growth. The results are shown in Table 8 (a) and (b). Three sets of findings are noteworthy.

First, measuring growth by the survey mean, Table 8 (a) shows that *all* regression coefficients for the three types of poverty measures—headcount, poverty gap, and squared poverty gap—are negative and highly significant at the 1 percent level. When growth is measured by GDP per capita, as in Table 8 (b), only two of the poverty coefficients are significant and none of them are significant at the 1 percent level. These differing results suggest that when growth is measured by the survey mean, economic growth *does* reduce poverty; however, when growth is measured by GDP per capita, there is no particular statistical relationship between growth and poverty. These disparate results reflect the surprisingly weak relationship between trends in income measured by household surveys, and trends in income as measured by national accounts.

Second, when growth is measured by the survey mean, the point estimate for the growth elasticity of poverty for the headcount ratio is *very* close to the one estimated by Bruno, Ravallion, and Squire (1998). These authors obtained a growth elasticity of poverty of –2.12, while the growth elasticity of poverty in Table 8 (a) is –2.24. In other words, a 10 percent increase in growth (measured by the survey mean) can be expected to produce between a 21.2 and 22.4 percent decrease in the proportion of people living in poverty ($1 per person per day).

Third, when growth is measured by the survey mean, the data show that growth has a greater impact on the more sensitive measures of poverty. Using the poverty headcount ratio, the growth elasticity of poverty for low-income countries (-2.57) is higher than that for the full sample of countries (-2.24). Moreover, the growth elasticities for both the poverty gap and the squared poverty gap measure are higher than that for the simple headcount ratio. While a 10 percent increase in growth can be expected to lead to a 22.4 percent decline in the headcount index, it will lead to a 25.4 percent fall in the poverty gap and a 24.5 percent decrease in the squared poverty gap. When growth is measured by the survey mean, the data clearly show that growth reduces poverty faster for more sensitive poverty measures.

Because one region—Eastern Europe and Central Asia—had such a poor poverty record during the period under analysis, it is interesting to see if these econometric results are robust when data from this region are excluded. Tables 9 (a) and (b) thus re-estimate the growth elasticities of poverty when data from the former Soviet bloc countries are excluded.[18] On the whole, the results mirror those in the previous table. Measuring growth by the survey mean, Table 9 (a) shows that all regression coefficients for the three types of poverty measures are negative and highly significant. When growth is measured by the survey mean, the point estimate for the headcount ratio of poverty (-2.05) is slightly smaller than that (-2.24) estimated in Table 8 (a), but is still very close to the one (-2.12) estimated by Bruno, Ravallion, and Squire (1998). Finally, as in Table 8 (a), when growth is measured by the survey mean, the growth elasticities for both the poverty gap and the squared poverty gap measure are higher than that for the simple headcount ratio. When growth is measured by the survey mean, the data again show that economic growth reduces poverty faster for more sensitive poverty measures.

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[18] In Tables 9 (a) and (b), data from the following 12 former Soviet bloc countries are excluded: Belarus, Bulgaria, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Romania, Russian Federation, Turkmenistan, Ukraine, and Uzbekistan.

Table 8a. Growth Elasticities of Poverty, Estimated Using Survey Mean Income (Consumption)

Poverty measure	*Growth elasticity of poverty*	*Adjusted R^2*
Poverty headcount ($1.08/person/day)		
Low-income countries	-2.57	0.72
	(-9.97)*	
Lower middle-income countries	-1.93	0.29
	(-4.65)*	
Full sample	-2.23	0.57
	(-11.10)*	
Poverty gap index		
Low-income countries	-3.08	0.74
	(-10.53)*	
Lower middle-income countries	-2.03	0.21
	(-3.77)*	
Full sample	-2.53	0.51
	(-9.86)*	
Poverty gap squared index		
Low-income countries	-3.27	0.70
	(-8.95)*	
Lower middle-income countries	-1.71	0.15
	(-2.94)*	
Full sample	-2.44	0.42
	(-8.04)*	

Notes: Estimates were obtained using ordinary least squares, regressing the difference between household surveys in the log of the poverty measure on two variables: (1) the time elapsed between the surveys; and (2) the difference in the log of the real value of the survey mean (or GDP per capita). Results for the time elapsed variable (which is included to account for the uneven spacing of the surveys) are not shown. T-ratios are in parentheses. Sample sizes are 59 intervals for low-income countries, 42 intervals for lower middle-income countries, and 101 intervals for the full sample. See Table 1 for countries and survey dates.

*Significant at the 0.01 level

Table 8b. Growth Elasticities of Poverty, Estimated Using GDP per capita, 1999 PPP Values

Poverty measure	*Growth elasticity of poverty*	*Adjusted R^2*
Poverty headcount ($1.08/person/day)		
Low-income countries	0.554	0.09
	(2.33)**	
Lower middle-income countries	-0.691	0.01
	(-1.17)	
Full sample	0.405	0.01
	(1.54)	
Poverty gap index		
Low-income countries	0.692	0.10
	(2.49)**	
Lower middle-income countries	-1.016	0.02
	(-1.40)	
Full sample	0.471	0.01
	(1.49)	
Poverty gap squared index		
Low-income countries	0.796	0.09
	(2.06)	
Lower middle-income countries	-1.024	0.04
	(-1.36)	
Full sample	0.304	-0.01
	(0.79)	

Notes: Estimates were obtained using ordinary least squares, regressing the difference between household surveys in the log of the poverty measure on two variables: (1) the time elapsed between the surveys; and (2) the difference in the log of the real value of the survey mean (or GDP per capita). Results for the time elapsed variable (which is included to account for the uneven spacing of the surveys) are not shown. T-ratios are in parentheses. Sample sizes are 59 intervals for low-income countries, 42 intervals for lower middle-income countries, and 101 intervals for the full sample. See Table 1 for countries and survey dates.

** Significant at the 0.05 level.

Table 9a. Growth Elasticities of Poverty, Estimated Using Survey Mean Income (Consumption) (excluding former Soviet bloc countries)

Poverty measure	*Growth elasticity of poverty*	*Adjusted R^2*
Poverty headcount ($1.08/person/day)		
Low-income countries	-2.03	0.76
	(-10.42)*	
Lower middle-income countries	-1.97	0.32
	(-4.47)*	
Full sample	-2.05	0.59
	(-10.73)*	
Poverty gap index		
Low-income countries	-2.81	0.75
	(-10.03)*	
Lower middle-income countries	-2.03	0.24
	(-3.62)*	
Full sample	-2.31	0.52
	(-9.33)*	
Poverty gap squared index		
Low-income countries	-3.33	0.70
	(-8.08)*	
Lower middle-income countries	-1.89	0.17
	(-2.97)*	
Full sample	-2.35	0.43
	(-7.52)*	

Notes: Estimates were obtained using the procedures outlined in Table 8 (a) and (b). T-ratios are in parentheses. Sample sizes are 30 intervals for low-income countries, 43 intervals for lower middle-income countries, and 78 intervals for the full sample. See footnote 18 for a list of the excluded former Soviet countries and Table 1 for other countries and survey dates.

*Significant at the 0.01 level

Table 9b. Growth Elasticities of Poverty, Estimated Using Survey GDP per capita, 1999 PPP Values (excluding former Soviet bloc countries)

Poverty measure	*Growth elasticity of poverty*	*Adjusted R^2*
Poverty headcount ($1.08/person/day)		
Low-income countries	0.43	0.19
	(2.99)*	
Lower middle-income countries	-0.13	-0.01
	(-0.19)	
Full sample	0.57	0.04
	(2.28)**	
Poverty gap index		
Low-income countries	0.57	0.17
	(2.80)*	
Lower middle-income countries	-0.33	-0.01
	(-0.37)	
Full sample	0.68	0.04
	(2.27)**	
Poverty gap squared index		
Low-income countries	0.74	0.12
	(2.24)**	
Lower middle-income countries	-0.722	0.01
	(-0.75)	
Full sample	0.55	-0.01
	(-1.38)	

Notes: Estimates were obtained using the procedures outlined in Tables 8 (a) and (b). T-ratios are in parentheses. Sample sizes are 30 intervals for low-income countries, 43 intervals for lower middle-income countries, and 78 intervals for the full sample. See footnote 18 for a list of the excluded former Soviet countries and Table 1 for other countries and survey dates.

*Significant at the 0.01 level.

** Significant at the 0.05 level.

Conclusion

We have used a literature review and analysis of a new household data set to address the fundamental question: "To what extent does economic growth reduce poverty in the low-income countries of the world?" Our basic finding is that economic growth represents an important and necessary means for reducing poverty in the developing world. The empirical record presented in this paper shows a strong, statistical link between economic growth and poverty reduction in developing countries.

Why is economic growth essential in reducing poverty? The answer to this question has been broached at several different points in this analysis. Economic growth reduces poverty because growth raises average incomes without any systematic impact on income inequality. Income distributions do not generally change much over time. Analysis of the 50 countries and the 101 intervals included in our data set shows that income inequality rises on average less than 1.0 percent per year. Moreover, econometric analysis shows that growth in income – however measured -- has no statistical effect on income distribution. As income changes, inequality may rise, fall, or (most likely) remain stable.

Because income distributions are relatively stable over time, economic growth—in the sense of rising incomes—has the general effect of raising incomes for all groups of society, including the poor. As noted above, poverty in many developing countries, as measured by the $1 per person per day standard, tends to be "shallow" in the sense that many people are clustered right below (and above) the poverty line. Thus, even a modest rate of economic growth "lifts" people out of poverty. Poor people are capable and willing of using economic growth—especially labor-intensive economic growth, which provides more jobs—to "work" themselves out of poverty.

Table 10 underscores these key relationships by summarizing the results of recent empirical studies of the growth elasticity of poverty. The point estimates of the elasticity of poverty with respect to growth are remarkably uniform: from a low of –2.12 in Bruno, Ravallion, and Squire (1998), to a mid-range of –2.24 in this study, to a high of –3.12 in Ravallion and Chen (1997). In other words, a 10 percent increase in economic growth (measured by the survey mean) can be expected to produce between a 21.2 and 31.2 percent decrease in the proportion of people living in poverty ($1 per person per day). Economic growth reduces poverty in the developing countries of the world because average incomes of the poor tend to rise proportionately with those of the rest of the population.

Table 10. A Comparison of Different Growth Elasticities of Poverty, Estimated Using Survey Mean Income (Consumption)

Source	*Number of countries*	*Number of intervals*	*Poverty measure*	*Growth elasticity of poverty*
Ravallion and Chen	42	42	Proportion of population	-3.12
(1997: Table 6)			consuming less than $1/day	(-2.62)*
Bruno, Ravallion and	20	?	Proportion of population	-2.12
Squire (1998: 127)			consuming less than $1/day	(-4.67)**
Present Study	50	101	Proportion of population	-2.24
			consuming less then $1/day	(-11.10)**

* Significant at the 0.05 level

** Significant at the 0.01 level

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